

REMARKS

Claims 14-19 and 21-25 are pending. Claims 23-25 have been withdrawn by the Examiner from consideration.

Reconsidering the Rejections Based On Kovac

Claims 14, 15 and 19 stand rejected as being obvious over Kovac (6,525,429). Applicant respectfully submits that the Examiner has misinterpreted Kovac and failed to consider valid limitations in Claims 14 and 15.

Claims 14 and 15 recite a protective material (1) fully curable by exposure to ultraviolet light and (2) shrinking 10% or less by volume upon curing. Claim 19 recites coating a semiconductor die with a polymer that is (1) fully curable by exposure to ultraviolet light and (2) shrinks 10% or less by volume upon curing. Kovac does not teach or suggest both limitations.

The Examiner notes correctly that Kovac teaches that Dow 577 elastomer shrinks by approximately 5% upon curing. Kovac, however, does not teach that the Dow 577 elastomer is fully curable by exposure to ultraviolet light. Rather, Kovac teaches the Dow 577 elastomer is heat cured -- "In the case of Dow 577 elastomer, the elastomer is typically heated to approximately 125° C. for 40 minutes." Kovac, column 5, lines 36-37.

Nowhere does Kovac suggest a protective material that is both (1) fully curable by exposure to ultraviolet light and (2) shrinks 10% or less by volume upon curing.

The Examiner also argues that "fully curable by exposure to ultraviolet light" is a process limitation that cannot be relied on for patentability in Claims 14 and 15. In support, the Examiner states that "whether the polymer is cured by heating or exposure to ultraviolet radiation is immaterial, since the resultant product is exactly the same, that is, a cured resin." The Examiner's argument is insufficient to support the rejection for two reasons.

First, "fully curable by exposure to ultraviolet light" is not a process limitation. In the example described in the Specification, the protective material is a mixture of D.E.N. 431 epoxy novolac resin and CD1011 photoinitiator. This mixture has the **characteristic** that it is fully curable by exposure to ultraviolet light. Unlike method Claim 19, device Claims 14 and 15 do not recite exposing the material to ultraviolet light

or fully curing the material by exposing it to ultraviolet light. Rather, Claims 14 and 15 recite a characteristic of the protective material, not a method step for processing the material.

Second, neither Claim 14 nor Claim 15 recites "a cured resin." The Examiner's reference to a cured resin is not relevant to the claim limitations. To the extent the Examiner is suggesting that the Dow 577 elastomer described in Kovac when cured "is exactly the same" as the protective material recited in Claims 14 and 15 when cured, then she is respectfully requested to provide supporting evidence. There is as yet no evidence in the record, absolutely none, that supports the supposition that Dow 577 elastomer when cured is "exactly the same" as the mixture of D.E.N. 431 epoxy novolac resin and CD1011 photoinitiator when cured or any other protective material fully curable by exposure to ultraviolet light.

Finally with regard to Kovac, the Examiner has misread Fig. 2 of the present application and, therefore, improperly interpreted "substantially all of the die" as reading on protective material covering only one side of a die. Fig. 2 shows clearly that semiconductor device 10 is completely surrounded by encapsulating material 28, except perhaps along a thin portion at the far right hand corner of the package where device 10 is shown extending to the edge of the package. This is actually an error in the drawing -- both sides of semiconductor device 10 lie fully encapsulated as shown along the left side of device 10. Nevertheless, there is nothing even in this depiction in Fig. 2 that justifies expanding the definition of "substantially all" from the plain meaning of the term to include a die only half covered with the protective material.

Rejections Based On Xu

Claims 15-22 were rejected under Section 103 as being obvious over Xu (6168898) in view of Higgins (5583370). Xu lists phenol-formaldehyde novolac resins and triaryl sulfonium hexafluorophosphate as suitable materials for dielectrics in microvias and solder masks. Xu column 1, lines 59-63 and all of Examples 1-12. Higgins teaches covering the top and sides of a semiconductor die with "shrinkable polymers." See Higgins Figs. 1-13. The combination of Xu and Higgins, therefore, does not teach or even suggest coating substantially all of the die with any kind of polymer.

In addition, the fact that Xu lists phenol-formaldehyde novolac resins and triaryl sulfonium hexafluorophosphate as suitable materials (along with a veritable laundry list of other materials) for his dielectrics does not render obvious any and all uses of such materials. There is nothing in Xu that even remotely suggests using these materials for any kind of semiconductor package, specifically including covering the top of a semiconductor die as in Higgins.

Obviousness can only be established by combining the teachings of the prior art to produce the claimed invention where there is some teaching, suggestion, or motivation to do so found in the references themselves or in the knowledge generally available to one of ordinary skill in the art. The Examiner must rely on objective evidence and make specific factual findings with respect to the motivation to modify references. MPEP § 2143.01; See, e.g., *In re Sang Su Lee*, 277 F.3d 1338 (Fed. Cir. 2002). There is nothing in Xu that can reasonably be deemed to teach or suggest that any of his materials could or should be used as constituent parts of a protective material covering a semiconductor die. Similarly, there is nothing in Higgins that teaches or suggests looking to the dielectrics disclosed in Xu for other types of die coatings. The combination, therefore, is not properly motivated.

The foregoing is believed to be a complete response to the pending office action.

Respectfully submitted,

A handwritten signature in black ink, appearing to read 'S. Ormiston', written over a horizontal line.

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